

7-3: Multiplication Counting Principles

Warm-up: 1. How many sets of answers are possible if a true-false test has:

- a. 1 question? b. 2 questions? c. 4 questions? d. 10 questions?

2. State a generalization about the number of sets of answers that are possible for a true-false test.

Multiplication Counting Principle:

Example 1: A quiz has 10 questions, each of which can be answered “always,” “sometimes,” or “never.” If you guess on each question, what is the probability of answering all questions correctly?

Arrangement:

Theorem (Selections with Replacement):

Example 2: How many license plates are possible with 4 letters, utilizing the letters A to Z (excluding I and O), followed by 2 digits from 0 to 9?

Example 3: How many orders of finish are possible in a 7-horse race?

n Factorial:

Theorem (Selections without Replacement):

Time for a Challenge: Complete these problems and explain how you solved them for bonus points. Do them on a separate piece of paper. (2 points each)

1. $(k+1)! - k!$
2. $\frac{(k+1)! - k!}{k!}$

$$3. \frac{(k+1)!+k!}{(k+1)!-k!} \qquad 4. \frac{1}{k!}-\frac{1}{(k+1)!}$$

Homework:

"I've always tried to go a step past wherever people expected me to end up." - Beverly Sills